

REMARKS

Claim Interpretation

The Examiner noted that steps (d) – (f) in claim 17 are optional and for that reason the limitations of claim 19 are met when step (d) is not present. Applicants have now amended claim 17, steps (e) and (f) so that the step is no longer optional.

Claim Rejections – 35 U.S.C. §103

Claims 1-29 are rejected under 35 U.S.C. §103(a) as being unpatentable over Lewis et al. (U.S. Patent No. 6,177,578) in view of Lewis et al. (U.S. Patent No. 5,232,820).

The essence of the present invention is the production of filamentary particles. Such particles and methods for their preparation are not disclosed or suggested by the cited prior art.

The Lewis et al reference, U.S. Patent No. 5,232,820 discloses crystals, not filamentary particles. The same reference also discloses in column 4, line 68 and column 5, lines 1-4, that "having an average particle diameter of about 0.02 micrometer crystals of undesirable size can be reformed by aging or chilling with water reconstitution to provide a dispersion of more uniform crystalline size within the desired range".

As regards to forms, the particles of the reference invention is, accordingly, crystalline, while that of the present invention is filamentary or string-like.

Applicants do not disagree that lithium salt crystals can be grown to larger sizes, for instance, by prolonged digestion of the dispersion at temperatures of 50°C or more. However, while this procedure results in larger crystals, they are still of tabular form with sizes up to 5 microns x 10 microns x 0.5 microns. The length-to-width ratio of the larger crystals is essentially the same as that of the smaller crystals, i.e. about 2:1.

The filamentary particles of LiPCDA (pentacose-10, 12-diynoic acid and others) of the present invention are distinct from the tabular crystals of LiPCDA (and others) described in the '578 patent. Not only do the filamentary particles have a clearly distinct length/width ratio, but they do not exhibit common characteristics of crystals. Crystals have a regular, three-dimensional arrangement of their component molecule. They are rigid and are bound by well-developed flat surfaces having straight edges. The filamentary particles of the present invention are neither rigid nor straight and do not exhibit a flat surface. Their characteristic is hair-like. Observation in the optical microscope shows the filamentary particles to be curved, frequently with multiple curves. In the optical microscope such particles can be observed in motion in the liquid dispersion and they appear to bend around immobile objects in the same manner as a long piece of string would bend around a rock in a stream.

U.S. Patent No. 5,232,820 teaches a process of making thermochromic quaternized polyacetylene dye salt derivatives.

The present invention does not claim or use such dye salt derivatives. In addition, the reference teaches crystals which are distinguished from the hair-like forms of the present invention as discussed above.

As to the responsiveness of radiation exposure, the prior art polyacetylene compounds appear to be incapable of forming stable radiation dosage indicia while the present invention, in the form of hair-like particles, exhibit a significantly greater sensitivity than the plate-like particles of the same compounds (see, for example, Example 19 of the specification).

As to the holding of obviousness, applicants would like to cite the requirements stated in *Graham v. John Deere Co.*, namely:

1. Determining the scope and contents of the prior art
2. Ascertaining the differences between the prior art and the claims at issue

3. Resolving the level of ordinary skill in the pertinent art
4. Considering objective evidence present in the application indicating obviousness or non-obviousness.

Some, if not all, of these requirements have not been met in the rejection.

1. The scope and content of the prior art have not been adequately met because the forms of the prior art compounds are crystalline, while the form of the present invention is filamentary (hair-like, string-like, bristle-like).
2. The differences between the prior art and the claims at issue are, again, not fully appreciated because the filamentary nature of the compounds of the present invention are treated as equivalent to those of the crystalline forms of the prior art.
3. The level of ordinary skill in the prior art does not appear to be an issue since the prior art is directed to essentially the same objects as the present invention. However, the method of achieving those objects is not met in the prior art and for that reason, not accomplished.
4. Objective evidence present in the application, namely, producing filamentary compounds/compositions are not taught or suggested in the prior art. The prior art does not teach or suggest such filamentary particles and, consequently, does not suggest a method of producing them. As discussed above, the modification of the particles in terms of length to width ratio is not taught, and even if it did, the modification of crystalline particles in terms of length to width ratio would not suggest the hair-like, string-like filamentary particles of the present invention. The supporting evidence of Lewis et al. (U.S. Patent No.5,232,820) relates to crystals and not to filamentary materials.

As applicants see the rejection under 35 .S.C. §103(a), there are two issues to be addressed: (1) whether the references disclose a hair-like filamentary form; and (2) whether the hair-like, filamentary form is superior in function to the plate-like forms of the prior art.

1. Analyzing the references under (1) the following passages are relevant in U.S. Patent No. 6,177,578:

Column 1, lines 62-63: The polyacetylene compound “exists in an ordered state as in crystals or in an oriented monolayer”;

Column 2, lines 3-6: “These chemical ions, atoms or groups provide molecular alignment in the crystal structure so that only a small atomic motion within the polyacetylene unit is required to effect polymerization.”;

Column 2, lines 57-61: “The term “imageable” is used throughout the description of the present invention to describe a composition, film, mixture, laminate, etc. which contains polyacetylene compounds which, upon exposure to ionizing radiation, will produce a color image.”;

Column 3, line 16 “...capable of polymerizing the crystalline photosensitive acetylenic component(s) to the corresponding imageable homopolymer(s)...”; and

Column 4, lines 10-12: “Most of these diacetylenic components used in the present invention are prepared and used in crystalline form.”

In U.S. Patent No. 5,232,820 the following passages are relevant:

Column 2, lines 14-15: “...there is provided a crystalline thermochromic recording compound...”; and

Column 5, lines 1-4: “Crystals of undesirable size can be reformed by ageing or chilling with water reconstitution to provide a dispersion of more uniform crystalline size within the desired range.”

As can clearly be seen, the two references relate to crystalline compounds and not hair-like, thread-like filamentary forms of the compounds.

2. The hair-like filamentary form is superior to the plate-like particles as shown, for example, in Example 19 of the present invention.

Part 1, filamentary particles show a 40-100 μm length and less than 1 μm width (Solution B). When gelatin was added to Solution B, the resulting dispersion was composed of plate-like particles of 2-20 μm by 5-50 μm .

Part 2, first paragraph: "Microscopic observation of the resulting dispersion revealed plate-like particles of about 1-2 μm size."

Part 2, last paragraph: "Microscopic observation of the resulting dispersion revealed plate-like particles of about 1-2 μm size."

Part 3, first paragraph: "Microscopic inspection showed filamentary particles predominantly having a length greater than 100 μm and a width of less than 1 μm .

As to (2) above, whether the hair-like, filamentary particles are superior to the plate-like form of the cited prior art, is as follows:

In Example 20: "The dispersion (of the filamentary particles) exhibited an extremely high radiation sensitivity."

The viscosity of the dispersion was about 50 to about 500 cps. Microscopic inspection showed that the hair-like particles in the dispersion grew from a length of 30 μm to 1,000 μm .

When the viscosity was reduced to 10 cps and the length of the filament reduced to about 20 μm , the sensitivity was reduced to about 80 cps due to the particle size reduction.

When the dispersion was ripened again, the viscosity increased to 100 cps and filament length increased to 100 μm a marked increase in radiations sensitivity was noted.

In Example 22, hair-like crystals of approximately 40 μm length and diameter of submicron were observed under microscope and showed sensitivity to radiation.

Similar results were observed in Example 23 as in Example 20 with respect to the hair-like particle size and radiation sensitivity.

Applicants respectfully submit that the present invention is clearly distinguished over the cited references in both the structural form of the claimed compounds and their radiation sensitivity.

Applicants have now amended claim 1 to distinguish the filamentary particles of the present invention from having no platelet particles therein.

The result shown in the specification as to radiation sensitivity is unexpected and surprising. Such results are also unexpected by the cited prior art because, simply, said prior art is unaware of the hair-like particles that their compounds can be in such structural formulation. See for example, In re Papesch, 325 F.2d 381, 137 USPQ 43 (CCPA 1963); In re Boesch, 657 F.2d 272, 205 USPQ 215 (CCPA 1980); and In re Fouche, 439 F.2d 1237, 167 USPQ 429, 433 (CCPA 1971). Applicants have shown indirect comparative tests in their specification.

The reported cases in the CCPA is acknowledged to be pertinent to the rejection under 35 U.S.C. §103(a). However, the response lacks the appropriate basis, namely, that the platelet form is structurally different from the hair-like thread form, and that the hair-like thread form affects a superior radiological quality. No such distinguishing criteria was addressed by the Examiner.

For the above reasons, the rejection of the claims under 35 U.S.C. §103(a) should be withdrawn. Such action is respectfully solicited.

The prior art made of record and not relied upon in the rejection is acknowledged to be pertinent.

Respectfully submitted,

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